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09/741,330	12/20/2000	Hiroaki Matsuyama	14167	6152

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SCULLY SCOTT MURPHY & PRESSER, PC  
400 GARDEN CITY PLAZA  
GARDEN CITY, NY 11530

EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT PAPER NUMBER

2871

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/741,330

Applicant(s)

MATSUYAMA ET AL.

Examiner

Prasad R Akkapeddi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Claim Objections***

2. Claim 7 is objected to because of the following informalities: change 'rotrusions' to 'protrusions'. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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4. Claims 2 and 3 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention: The new matter includes "equal to a distance". Although the applicant's argues that one of ordinary skill in the art would interpret the phrase "a thickness with which said black matrix layer/overlapped edge portion protrudes from a surface...." as meaning a thickness "equal to a distance" which said layer/portion protrudes from a surface, but the Examiner maintains that the term "equal to a distance" is new matter not disclosed in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention: The claimed limitation 'a black matrix layer is formed below the underlying layer to a thickness equal to a distance which the black matrix layer protrudes from a surface of the color filter corresponding to the pixel electrode' is not clearly defined due to the lack of the definition of the indicated 'distance'.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kume et al. (Kume) (U.S. Patent No. 6,115,098) in view of Yamada et al. (Yamada) (U.S. Patent No. 6,327,016).

As to claims 1 and 6-8: Kume discloses a liquid crystal display device with a pixel electrode substrate (1) including pixel electrodes (6), active elements (TFT, Col. 15, line 7), color filters (not shown, Col. 11, line 22) and a first alignment layer (5b) covering the pixel electrodes, the active elements the said color filters, an opposing substrate (2) including a common electrode (4) and a second alignment layer (5a) covering the common electrode (4) and opposing to the alignment layer of pixel electrode substrate (1), a liquid crystal layer (8) disposed between the first and second alignment layers (5a and 5b), wiring patterns (Fig. 4b) related to the active elements of the pixel electrode substrate and arranged around pixel electrodes (6) and protrusions (Fig. 4A) protruding from a surface of the pixel electrodes toward the common electrode (4) and extending along the wiring patterns to form slopes (Fig. 4A), the liquid crystal layer being controlled such that in an initial orientation of liquid crystal layer, orientation of liquid crystal molecules of the liquid crystal layer is divided to a plurality of orientations by the slopes (Fig. 4A). Kume also discloses that the active elements are thin film transistors (Col. 25, line 7), the transparent electrode films (3) of the pixel electrodes (6) are separated from slopes of the

protrusions surrounding the pixel electrodes (Fig. 4A) and the liquid crystal molecules of the liquid crystal layer have a negative dielectric anisotropy (Col. 15, line 48).

Kume does not disclose that 'a thickness of the liquid crystal layer between the pixel electrode and the common electrodes being substantially the same such that a first gap at edge portions of the pixel electrode becomes substantially the same as a second gap at the center portion'. Yamada on the other hand in disclosing the prior art for a liquid crystal device, discloses that the thickness of the liquid crystal layer is substantially same at the edge portions and the center portion (Fig. 3, marked as h sub p).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the structure as disclosed by Yamada to the device of Kume to improve the transmittance, the response speed and the stability of alignment of the liquid crystal molecules (col. 4, lines 64-67).

9. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kume in view of Yamada, as applied to claims 6-8 above and further in view of Kishimoto (U.S. Patent No. 6,437,847).

Kume in view of Yamada disclose a liquid crystal display device with a pixel electrode substrate including pixel electrodes, active elements, color filters, a first alignment layer, a second substrate with a common electrode and a second alignment layer, a liquid crystal layer, slopes and wiring patterns.

Yamada also discloses the orientation of liquid crystal molecules of the liquid crystal layer is divided to a plurality of orientations by the slopes.

However, neither Kume nor Yamada explicitly disclose the thickness of the black matrix layer. Kishimoto on the other hand, in disclosing a liquid crystal display device discloses all the above features and in addition discloses the thickness of the black matrix and its relationship to the surface of the color filter (col. 6, lines 41-62). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the structure as disclosed by Kishimoto to the structure of Kume and Yamada to provide a display device having improved display quality and wide viewing angle characteristic, capable of preventing unevenness of cell gap within the display region and reducing problems caused by such uneven cell gap such as uneven brightness, color and viewing angle characteristic (col. 3, lines 12-18).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kume in view of Yamada as applied to claim 1 and further in view of Kuo (U.S. Patent No. 6,424,397).

a. As to claim 4: Kume discloses in Fig. 4 that the slopes are parabolic and the relationship of the slope tilt angle to the height and length (From Fig. 4 one can see that the height is about 5 arbitrary units and the length is about 10 arbitrary units thus making the angle more than 11 degrees) and the ratio of the gaps can be calculated from this figure. Again, Kuo also discloses that the protrusion angles are between 1- 89 degrees (Col. 17, lines 61-62). Therefore, it

would have been obvious to one having ordinary skill in the art at the time the invention was made to calculate slope angle and the gap ratios.

11. Claims 5, 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kume in view of Kuo (U.S. Patent No. 6,424,397).

b. As to claims 5, 9-10: Although Kume discloses that the protrusions are formed on the pixel substrate (1) where the color filter and black matrix are also located, Kume does not disclose that the protrusions can also be formed on the common electrode substrate. Kuo on the other hand, in disclosing a similar wide viewing angle liquid crystal display (Fig. 4E), discloses protrusions (418) in the common electrode (416 a,b) substrate (402) that extend toward the pixel electrode substrate (400), electrode openings. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the electrode openings and the corresponding slopes as disclosed by Kuo to the liquid crystal device disclosed by Kume to enhance the wide angle viewing capability for these liquid crystal displays.

12. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kume in view of Kuo.

Kume discloses a method of making a liquid crystal display (Col. 27 and 28). Kume however, does not explicitly disclose a method of forming the color filters on the pixel substrate (Kume mentions the use of color filters in Col. 11, line 22). The filling of the gaps between the color filters by the black matrix is very well known. Kume also discloses the black matrix (Col. 11, line 12). Kume also



discloses the initial orientation control such that liquid crystal molecules on the pixel electrodes between the opposing substrate and the pixel electrode substrate vertically toward the slopes (Col. 12, lines 32-51) and the orientation of the molecules with applied voltage (Col. 12, lines 32-36). Kuo also discloses a method of forming a wide viewing angle liquid crystal display device with color filters on the common substrate side.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the method of fabricating the device as disclosed by Kuo to the liquid crystal device disclosed by Kume to enhance the wide angle viewing capability for these liquid crystal displays and to enhance the brightness, aperture ratio, response time and display characteristics of the device. In addition, the method is capable of increasing the processing window thus lowering the cost of production of these devices (col. 3, lines 40-46).

### ***Response to Arguments***

13. Applicant's arguments with respect to claims 1-15 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 703-305-4767. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 703-305-3492. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-872-9318

for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0530.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0530.

*PRA*

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July 2, 2003

  
TOANTON  
PRIMARY EXAMINER